

NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD
Connecticut/Rhode Island
WETLAND RESTORATION
(Acres)
Code 657

DEFINITION

The re-establishment of the structure and function of a degraded wetland.

PURPOSE

To approximate or restore both the hydrologic conditions and the wetland plant community that occurred on the site before modification.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies only to modified wetland sites with hydric soils, and applies to both fresh water and salt water restoration sites.

This practice is applicable only if original hydrologic conditions, frequency and duration, of flooding and/or high groundwater conditions can be approximated.

If the presence of hazardous waste materials in the sediment or fill is suspected, soil samples will be collected and analyzed for the presence of hazardous waste as defined by local, state, or federal authorities. Sites containing hazardous waste will not be restored under this standard.

CRITERIA

General

Sites covered by fill or sediment must be capable of meeting hydric soil criteria or the fill and sediment shall be removed. Sites where original hydric soils have been previously removed, shall require replenishment.

Materials used for grade stabilization or water control structures will have a 25-year durability in the soil, water, and climate conditions associated with the site. Fire resistant materials will be used for exposed portions of structures where vegetation will be maintained by burning.

The landowner shall be responsible for obtaining permits required by federal, state, and local laws before restoration.

Hydrology Restoration

Hydrologic conditions of the site are defined as the rate and timing of inflow and outflow; duration, frequency, and depth of flooding, ponding or saturation.

The minimum restored hydrologic conditions of the site must meet or exceed the current USDA definition for a wetland.

The maximum hydrologic condition on the restored site will approximate the conditions that likely existed before alteration.

Surface Drainage Removal

Where open channels were constructed to drain the wetland, the channel will be filled with earth or controlled with a grade stabilization structure to restore the wetland hydrologic conditions. A water control structure may be required to manage water levels for wetland operation and maintenance.

Provisions will be made to store, pass or divert the flow from the 10-year frequency, 24-hour storm so that it does not cause erosion or adverse flooding.

Where the channel serves as an outlet for upstream lands, it is necessary to meet applicable state and local laws and regulations pertaining to flooding and surface and subsurface drainage.

The channel may be blocked with earth fill without a flow control device where flow duration and rate will not cause erosion and head cutting. The minimum length of channel to be filled will be based on the hydraulic conductivity

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(permeability) of the soil on the site. This information can be determined from published soil survey data or from an on-site investigation. In lieu of a detailed site analysis, the minimum length to be filled is 50 feet for soils with a hydraulic conductivity of less than 0.6 inches per hour, 100 feet for 0.6 to 2.0 inches per hour and 150 feet for greater than 2.0 inches per hour. The side slopes on channel blocks perpendicular to channel flow shall be 5:1 or flatter. All fill shall be compacted to achieve the density of adjacent materials. The fill for the channel block shall be crowned a minimum of one foot above the top of the lowest existing channel bank to account for settlement and to prevent concentrated flow over the channel block.

Grade Stabilization Structure

Grade control measures shall be used when the 10-year frequency 24-hour duration storm flow or base flow results in peak velocities exceeding three feet per second or continuous flow duration more than 48 hours. Any grade stabilization structure shall meet NRCS Practice Standard 410.

Water Control Structure

Water control structures will be used when it is desirable to control or manipulate the water level for operation and maintenance of the wetland at an elevation different than that caused by blocking the channel. Water control devices will meet appropriate NRCS standards.

The water control structure will be designed and installed in a manner to prevent internal soil erosion (piping) through or around the channel block.

Subsurface Drainage Removal

In areas where subsurface drains were used to remove surface water or soil saturation, the existing system will be modified to restore the wetland hydrologic conditions. Review of drainage records, interviews, and site investigations will be needed to determine the extent of the existing system. The effect of any modification to the existing subsurface drainage system on upstream landowners will be

evaluated and the landowner will be notified of potential off-site impacts. This evaluation will include both surface and subsurface impacts.

Where the subsurface drain serves as an outlet for upstream properties, it will be necessary to meet applicable state and local laws and regulations pertaining to subsurface drainage and flooding. Upstream surface and subsurface drainage will not be impacted unless appropriate easements are obtained or mitigation measures are implemented.

The effects of the subsurface drainage system may be eliminated by the following: removing a portion of the drain downstream from the edge of the site; modifying the drain with a water control device; or installing non-perforated pipe through a wetland site that is part of a larger drained area.

The minimum length of drain to be removed is 50 feet for soils with a hydraulic conductivity of less than 0.6 inches per hour, 100 feet for 0.6 to 2.0 inches per hour and 150 feet for greater than 2.0 inches per hour. All envelope filter material or other flow enhancing material will also be removed for this length. The trench will be filled and compacted to achieve a density equal to adjacent material.

Existing drains downstream of the site will be protected by flow control devices. Inflow will be limited to the capacity originally apportioned to the drain.

The water control structure will be attached to a non-perforated conduit that extends at least the minimum length previously specified for length of drain to be removed. The connections of the water control structure and the non-perforated pipe will be watertight at the head created at the maximum pool level.

Storage Volume Replacement

Where the wetland site has been filled by sediment, land shaping, or other activities, the storage may be replaced by excavating the fill material from the site or by construction of an earth embankment.

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Sediment deposition or other fill materials will only be removed to the original top of the buried hydric soil. Sediment will be removed and placed on upland sites.

Embankments

An earth embankment may be constructed to create a pool storage volume equal to that which existed prior to conversion of the site.

Embankments with an overall height of six feet or less will meet the criteria of the NRCS dike standard. Embankments with an overall height greater than six feet will meet the criteria of the NRCS embankment pond standard.

Embankments meeting criteria for dikes will safely pass a 10-year frequency, 24-hour storm at the dike design high water level.

Overall height is the difference in elevation in feet between the top of the embankment and the lowest elevation at the downstream toe.

Vegetation

The goal of vegetation restoration shall be to replicate an example of the original plant community based on site specific knowledge or knowledge of similar, undisturbed sites.

On sites where soil seedbanks of desirable species exist or natural succession of selected species will begin to occur in less than five years, natural regeneration will be allowed for revegetation. Specific guidelines that consider soil, seed source, and species will be developed in the planning and design phase.

Herbaceous wetland plantings shall be native species adapted to the site. Herbaceous vegetation may also be established by placing soil containing seed or tubers at a minimum depth of four inches over 50% of the site.

Forested wetland plantings shall consist of native tree and/or shrub species that are adapted to the site. Tree plantings will meet the criteria in NRCS tree establishment standards.

CONSIDERATIONS

The hydrology and vegetative characteristics of the site and its contributing watershed before alteration should be documented. This can be accomplished by review of drainage records, historical aerial photography, historic records, and site investigation. Vegetation can be determined from historic records or existing vegetation on similar soils on nearby sites.

Hydrologic conditions, including duration, depth, and timing are primary factors in vegetation establishment. The vegetation selected should be compatible with the planned hydrologic condition.

Nutrients and pesticides contained in surface and ground water, as well as accumulated sediments, may have an adverse effect on wetland vegetation. The nutrient and pesticide tolerance of the species planned should be considered where known nutrient and pesticide contamination exists.

This practice may be applied to sites that are adjacent to existing wetlands to increase wetland system complexity and diversity, decrease habitat fragmentation, and facilitate colonization of the site by wetland plants and animals.

When it is desirable to enhance the wetland's use and colonization by the flora and fauna, wetlands may be linked by corridors.

Sediment delivery to restored wetlands from surface water inflow should be reduced when low maintenance is required. This may be accomplished with watershed treatment, filter strips, riparian buffers, or sediment basins.

Embankments and excavated slopes should be located and shaped in a manner that is compatible with the existing landscape.

PLANS AND SPECIFICATIONS

Plans and specifications for the restoration of wetlands will be prepared for each site in accordance with the criteria for this practice.

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AS-BUILT DRAWINGS

As-built drawings shall be prepared showing all pertinent elements and elevations as actually installed. As-built data and drawings will be provided to the owner/operator, regulatory state agency and participating partners upon construction completion.

MONITORING

After installation, the site shall be periodically monitored to determine if the expected hydrology and vegetation conditions are met.

OPERATION AND MAINTENANCE

An operation and maintenance plan will be prepared for each wetland restoration site. The following activities will be addressed in the plan:

- Access
- Operation of water control structures, level and timing, for establishment of desired hydrologic conditions or for management of vegetation;
- Inspection schedule of embankments and structures for damage assessment;
- Depth of sediment accumulation allowed before removal required;
- Management needed to maintain vegetation, including control of unwanted vegetation;
- Acceptable uses and timing (e.g., grazing, haying, timber removal).